

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A composition ~~Compositions~~ comprising one or more ~~olefin~~ ethylene polymers ~~functionalized by at least one functionalization agent chosen from having one or more functional groups selected from the group consisting of a carboxylic acid acids, their esters, their anhydrides~~ an ester of a carboxylic acid, an anhydride of a carboxylic acid and metal salts thereof, and their ~~metal salts~~ and one or more first stabilizing agents ~~comprising~~ having one or more sterically hindered phenol groups and not more than one ester group, and at least one second stabilizing agent having one or more sterically hindered phenol groups and not having an ~~and at most one~~ ester functional group ~~from which at least one of the stabilizing agents is 1,3,5-trimethyl-2,4,6-tris(3,5-di-t-butyl-4-hydroxybenzyl)benzene.~~

Claim 2 (Currently Amended): The composition ~~Compositions~~ according to Claim 1, wherein the total amount of the stabilizing agent agents is between 0.001 and 1% by weight.

Claim 3 (Currently Amended) The composition ~~Compositions~~ according to Claim 1, comprising ~~wherein at least one of the olefin polymers functionalized by at least one functionalization agent chosen from carboxylic acids, their esters, their anhydrides and their metal salts~~ is an ethylene polymer ~~functionalized by~~ comprising a maleic anhydride functional group.

Claim 4 (Currently Amended): The composition ~~Compositions~~ according to Claim 3, wherein the maleic anhydride functional group is present in the ~~functionalized~~ ethylene polymer in an amount of 0.001 to 5% by weight.

Claim 5 (Currently Amended): The composition ~~Compositions~~ according to Claim 3, wherein the ethylene polymer having a functionalized by maleic anhydride functional group ~~has~~ exhibits a standard density of 915 to 960 kg/m³ and a melt flow index, measured at 190°C under a load of 5 kg, of 0.1 to 50 dg/min.

Claim 6 (Currently Amended): The composition ~~Compositions~~ according to Claim 1, further comprising wherein the composition is diluted in one or more nonfunctionalized olefin polymers not having a functional group.

Claim 7 (Canceled).

Claim 8 (Currently Amended): A process ~~Process~~ for the preparation of a stabilized composition ~~compositions~~ comprising one or more ~~functionalized olefin~~ ethylene polymers having a functional group and one or more stabilizing agents, wherein said process comprising

melt blending in an extruder one or more olefin ~~ethylene~~ polymers, one or more functionalization agents, one or more radical initiators, one or more first stabilizing agents ~~comprising~~ having one or more sterically hindered phenol groups and not more than one ester group, and one or more second stabilizing agents having one or more sterically hindered phenol groups and not having an ~~and at most one ester functional group from which at least one of the stabilizing agents is 1,3,5-trimethyl-2,4,6-tris(3,5-di-*t*-butyl-4-~~

~~hydroxybenzyl)benzene, and optionally one or more additives, are melt blended in a screw extruder.~~

Claim 9 (Currently mended): The process ~~Process~~ according to Claim 8, wherein at least one of the ~~olefin~~ ethylene polymers melt blended in ~~introduced into~~ the extruder is an ethylene polymer having ~~exhibiting~~ a standard density of 915 to 960 kg/m³ and a melt flow index, measured at 190°C under a load of 5 kg, of 0.1 to 200 dg/min.

Claim 10 (Currently Amended): The process ~~Process~~ according to Claim 8, wherein at least one of the functionalization agents melt blended in ~~introduced into~~ the extruder is maleic anhydride.

Claim 11 (Currently Amended): The process ~~Process~~ according to Claim 8, wherein the ~~processing~~ melt blending is carried out at a temperature of ~~lies~~ between 120°C and 290°C.

Claim 12 (Currently Amended): The process ~~Process~~ according to Claim 8, further comprising;

mixing the ~~wherein the~~ stabilized composition is ~~diluted in~~ with one or more nonfunctionalized olefin polymers.

Claim 13 (Canceled).

Claim 14 (Canceled).

Claim 15 (Canceled).

Claim 16 (Canceled).

Claim 17 (New): A stabilized composition obtained by the process as claimed in Claim 8.

Claim 18 (New): The process according to Claim 8, further comprising:
mixing the composition with one or more olefin polymers that do not comprise a functional group selected from the group consisting of a carboxylic acid, an ester of a carboxylic acid, an anhydride of a carboxylic acid, and metal salts thereof.

Claim 19 (New): The composition as claimed in Claim 1, consisting essentially of one of more of the ethylene polymers, the first stabilizing agent and the second stabilizing agent.

Claim 20 (New): The process according to Claim 8, wherein the stabilized composition consists essentially of one or more of the ethylene polymers, the first stabilizing agent and the second stabilizing agent.

Claim 21 (New): The composition as claimed in Claim 1, wherein the ethylene polymers are ethylene homopolymers.

Claim 22 (New): The process as claimed in Claim 8, wherein the ethylene polymers are ethylene homopolymers.

BASIS FOR THE AMENDMENT

Claims 1-6, 8-12 and 17-22 are active in the present application. Claims 7 and 13-16 have been cancelled. Claims 17-22 are new claims. Claims 1 and 8 have been amended to limit the polyolefin of the claimed composition to polyethylene (e.g., an ethylene polymer) and to require the presence of at least two different stabilizing agents. Support for the amendment to Claims 1 and 8 is found on page 2, lines 17-24. Support for new Claims 17-18 is found in the original claims and throughout the specification. New Claims 19 and 20 are dependent claims which further limit the compositions of independent Claims 1 and 8 by inclusion of the transition phrase "consisting essentially of." Support for inclusion of the transitional phrase "consisting essentially of" is found, for example, on page 2, lines 17-24 wherein the stabilizing agents of the specification are disclosed to be "chosen from stabilizing agents comprising one or more sterically hindered phenol groups which comprise an extra functional group and from stabilizing agents comprising one or more sterically hindered phenol groups which do not comprise an ester functional group." Further, on page 5, lines 26-29, it is disclosed that the composition "in a very particularly preferred way" contains only an ethylene polymer functionalized by maleic anhydride. Moreover, Comparative Example 2 on pages 13-14 of the specification is a stabilizing agent containing four ester functional groups. This stabilizing agent is demonstrated as not desirable by its negating effect on melt flow and thermal stability. Therefore, support for the transitional phrase "consisting essentially of" is found in the specification as originally filed as evidenced by (1) disclosure that may limit the selected stabilizing groups to those recited in amended Claims 1 and 8; (2) disclosure in the specification that states that it is preferred that only a polyethylene polymer is present as the polymer in the composition; (3) and the examples which demonstrate that stabilizing agents having more than one ester group are disfavored.

Therefore, the specification as originally filed discloses that the stabilizing agents present in the composition disclosed in the specification may be stabilizing agents have at most one ester functional group or no ester functional group. New dependent Claims 21 and 22 further define the polyethylene polymer of independent Claims 1 and 8 respectively. No new matter is believed to have been added by this amendment.

REQUEST FOR RECONSIDERATION

Applicants thank Examiner Mulcahy for the helpful and courteous discussion of November 4, 2003. During the discussion, Applicants' U.S. representative pointed out that compositions that contain only a maleic anhydride-functionalized polyolefin polymer and 1,3,5-trimethyl-2,4,6-tris(3,5-di-t-butyl-4-hydroxybenzyl) benzene (TTBHB) can provide improved thermal stability in comparison to compositions which contain, for example, a maleic anhydride-functionalized polyolefin polymer and a stabilizing agent that contains an ester functionality. The Examiner indicated that claims drawn to a composition that consists essentially of the components recited in original Claim 1 may receive favorable treatment pending a review of Applicants' arguments in support of patentability.

Claims 1 and 8 have been amended herein to require that the claimed composition contain (1) a polyethylene polymer, (2) one or more first stabilizing agents having one or more sterically hindered phenol groups and not more than one ester group, and (3) one or more second stabilizing agents having one or more sterically hindered phenol groups and not having an ester functional group.

Polyolefin polymers that are functionalized with groups such as maleic anhydride and/or carboxylic acids can be used as adhesives for connecting or adhering polyolefin resins to other types of resins (page 1, lines 11-14). Antioxidants may be added in order to impart thermal stability to such adhesive compositions (page 1, lines 14-18). Although conventional phenolic antioxidants may be effective for improving the thermal or oxidation stability of the resulting adhesive composition, a decrease in the effectiveness of the composition as an adhesive may result (page 1, lines 26-35). Applicants have claimed compositions, and processes for making the compositions, which exhibit better thermal stability and better long-term adhesion. The claimed compositions contain a functionalized polyethylene polymer, a first stabilizing agent having one or more sterically hindered phenol groups and not more than

one ester group, and a second stabilizing agent having one or more sterically hindered phenol groups and not having an ester functional group.

Applicants have demonstrated that improved adhesive performance and thermal stability can be achieved in compositions which contain at least one of a stabilizing agent having one or more sterically hindered phenol groups and not more than one ester group, or a stabilizing agent having one or more sterically hindered phenol groups and not having an ester functional group (see the Examples beginning on page 13 of the specification and the Declaration under 37 C.F.R. §1.132 submitted concurrently herewith).

Examples 1 and 2 provide a comparison of a composition which contains a stabilizing agent without ester groups with a composition containing an ester-functionalized stabilizing agent having four ester groups (pentaerythrityl tetrakis(3,5-di-t-butyl-4-hydroxylphenol propionate (PTBH)). The thermal stabilities of the composition containing the inventive stabilizing agent (Example 1) and comparative composition (Example 2) are disclosed in Table I on page 14 of the specification (reproduced below for convenience). Example 3-Dec of Table I provides a composition that contains a stabilizing agent that has a single ester group (e.g., stearyl-beta-(3,5-di-t-butyl-4-hydroxylphenol)propionate). Example 3-Dec is provided in Applicants' Declaration, an executed copy of which is concurrently submitted herewith.

Table I

Composition	MI ₅ without hydrolysis, dg/min	MI ₅ after hydrolysis, dg/min	Thermal stability without hydrolysis, min	Thermal stability after hydrolysis, min
Example 1	7.1	6.4	18.8	15.4
Example 2 (comparative)	7.2	0.1	18	0
Example 3-Dec	7.1	6.0	5.5	0

Boxed row = comparative example.

As is readily apparent from an inspection of the third and fifth columns of Table I above, the Examples 1 and 3-Dec are able to provide either or both of melt flow (MI₅) after hydrolysis and/or substantially better thermal stability in comparison to comparative Example 2 (see values in bold in the Table).

Applicants have therefore shown that a functionalized polyethylene composition that contains either a stabilizing agent that does not have an ester functional group or a stabilizing agent that has only one ester functional group is able to provide better melt flow and/or thermal stability after hydrolysis in comparison to a polyethylene composition that contains the same polymeric material (e.g., maleic anhydride functionalized polyethylene) and a stabilizing agent having more than one (e.g., four) ester functional group.

The Office rejected Claims 1-16 under 35 U.S.C. § 102(b) in view of a patent to Tsuri (U.S. 6,057,017). Claims 1 and 8 have been amended herein to require that the compositions include one or more ethylene polymers, a first stabilizing agent having no ester-functional group and a second stabilizing agent having not more than one ester-functional group.

Tsuri does not disclose a composition that comprises a functionalized ethylene polymer, a first stabilizing agent having no ester functional group and a second stabilizing agent having not more than one ester functional group as presently claimed. In fact, Tsuri discloses that ethylene polymers are unable to provide the performance properties required in the prior art invention. For example, it is disclosed in Tsuri:

A polyethylene-coated steel pipe which has hitherto been used in a pipeline for conveying petroleum, gas or water can only withstand use at a temperature not exceeding, say, 60°C, since polyethylene softens at a higher temperature. Even a pipe coated with high-density polyethylene can only withstand use at a temperature not exceeding, say, 70 °C or 80 °C, and cannot withstand continued use at 100 °C. (page 2, lines 13-16).

Although Tsuri discloses ethylene-propylene block copolymers (page 3, line 14) ethylene polymers are not disclosed. Since Tsuri does not disclose or suggest all of the present claim limitations, the prior art reference applied by the Office cannot anticipate or render obvious the presently claimed invention.

Applicants respectfully request the withdrawal of the rejection.

New dependent Claims 19 and 20 limit the composition and process of independent Claims 1 and 8, respectively, to compositions which consist essentially of the components explicitly recited in the claims. The transitional phrase “consisting essentially of” is used to describe compositions which contain at least the components explicitly disclosed in the claim and may further contain additional components so long as the additional components do not materially effect the basic or novel characteristics of the claimed invention. As stated in In re Janakirama-Rao, 137 USPQ 893, 896 (CCPA 1963), “[T]he word “essentially” opens the claims to the inclusion of ingredients which would *not* materially affect the *basic* and *novel* characteristics of Appellants’ compositions as defined in the balance of the claim, according to the applicable law” (emphasis in the original; see also MPEP § 2111.03-Transitional Phrases). Therefore, the composition claimed in independent Claim 1 and recited in independent Claim 8 excludes materials other than those explicitly recited in the claim when such materials would materially affect the basic and novel characteristics of the claimed composition.

Applicants have demonstrated that the presence of stabilizing agents containing more than one ester group negatively affect the thermal stability and viscosity properties (e.g., metal index – MI₅) of the claimed compositions. Tsuri requires the presence of pentaerythritol tetrakis (3-laurylthiopropionate) (col. 2, lines 35-43). Therefore Tsuri requires the presence of a stabilizing agent having four ester functional groups. A stabilizer

Application No. 09/926,414
Reply to Office Action of October 3, 2003

having more than one ester functional group is excluded by the transitional phrase appearing in new dependent Claims 21 and 22.

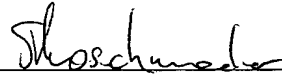
New dependent Claims 21 and 22 further define the ethylene polymer of present independent Claims 1 and 8 as homopolymers. Support for new dependent Claims 21 and 22 is found on page 4, line 18.

Application No. 09/926,414
Reply to Office Action of October 3, 2003

Applicants submit the amendment to the claims places all now-pending claims in condition for allowance. Applicants respectfully request the withdrawal of the rejections and the passage of all now-pending claims to Issue.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



Norman F. Oblon
Attorney of Record
Registration No. 24,618

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 08/03)

Stefan U. Koschmieder
Registration No. 50,238

NFO/SUK/law